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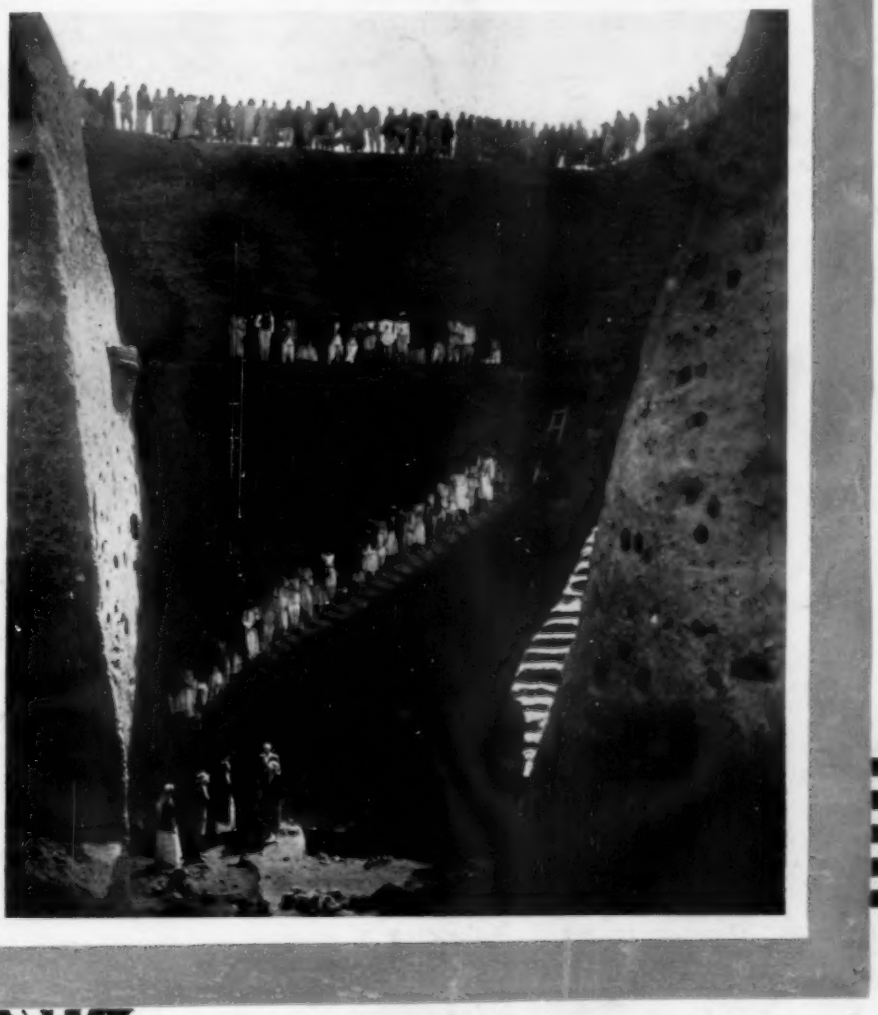
# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



APRIL 21, 1934

Pit Grave of Ancient Glory

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## DO YOU KNOW?

Small breeds of dog have a longer life span than large breeds.

According to estimates, there are at least 5,000,000 lepers in the world today.

A new kind of multiple match, which can be used about 40 times, has appeared on the German market.

Deer have been brought from Michigan to Indiana, and released in wild country in the south of the state.

"Electric eye" control is used to stop the high-speed elevators in the 69-story Rockefeller Tower in Radio City, New York.

Paper nails, made tough by hydraulic pressure, are a new invention designed to fill the need for a nail that will not conduct electricity.

CCC workers have been improving Death Valley, digging wells and locating springs and building truck trails and tourist accommodations in the park area.

Using soap on some kinds of fruit stains will set them.

Bronze razors used in Scandinavia in 1500 B.C. were shaped very much like modern razors.

Within the past million years, New England had among its animals the camel, rhinoceros, and mastodon.

The Field Museum is exhibiting a slab of clay-stone only four by six feet in which skeletons of 25 little deer are embedded.

Dynamite is reported to be cheaper than gas for destroying ants because gas does not destroy the eggs and has to be used repeatedly.

A paper company has found use for house flies: the legs and wings mixed with fine paper pulp give a peculiar and handsome pattern.

Experiments now in progress show that a virulent fungus dusted on corn plants has power to destroy the corn borer, turning the borers into hard pink mummies.

ENTOMOLOGY

# Insect Hordes Survive Winter; Ready for Attack on Crops

GOVERNMENT fighters against insect enemies of crops and orchards are getting set for a tough summer. A summary of surveys conducted during late winter and early spring shows that some of the most troublesome and widespread of insect pests have come through the winter with less than the normal percentage of killing, so that they may be expected to be unusually numerous this year.

Grasshoppers have been the cause of the most general apprehension, for they have worked much damage in the drier parts of the Northwest during the past two or three years, and the mild winter in that region has had little effect on their eggs. One good has, however, been blown by many ill winds: in parts of South Dakota the severe winter storms, scouring ground with no snow cover, have lifted its top layer and dried out the grasshopper eggs beneath it. In other places, the same blown soil has been deposited so deeply that the buried eggs have no chance to hatch their 'hoppers. Nevertheless, there are still plenty of eggs left to produce plenty of the pestiferous insects.

A Western pest, the Mormon cricket, threatens serious damage in parts of Idaho, Wyoming and Montana. Two of its outbreaks are on Indian reservations. In the warmer parts of the Midwest, two serious enemies of grain, chinch bug and Hessian fly, have come through the winter with very low mortality. One of the worst of insect pests in the East, the Japanese beetle, has been protected against the extreme cold of the late winter months by a thick blanket of snow on the ground, so that it has escaped the unusual losses which the low temperatures might otherwise have caused.

PHYSICS

# Physics Turns Time Backwards; Mind Again Eludes Analysis

## Minus as Well as Plus Time is Logical to Physical Science, Eddington Points Out, But Ridiculous to Consciousness

SCIENCE has difficulty in determining whether the physical sign-posts in our universe point to the future or to the past.

Sir Arthur Eddington in the Messenger Lectures at Cornell University asked:

"Do you get up in the morning and shave off the night's whiskers or do the whiskers that you think you have shaved off hop back onto your face and grow back into the roots from which you think they were cut while you sleep from morning back until evening?"

Both descriptions of the events may be true and scientifically sound, Sir Arthur emphasized. It is not that science has no way of telling the difference between the two descriptions, but that it has no way of attaching more significance to one than to the other. It uses both directions in time, just as mathematics uses plus or minus quantities, without considering that from a common sense point of view, such a quantity as minus time is nonsensical. While we are used to imaginary numbers in mathematics, expressed as the square root of minus one, which have no place in the ordinary scheme of digits, the use of minus time in physics, which is analogous, is shocking for man has depended for centuries upon physics to give him an account of the world about him.

The explanation is due to the position modern physicists have taken that matter, or the external world viewed by the mind, is somehow of the same stuff or quality as the mind itself, that it is an extension of the mind or of an entity similar to the mind.

The one thing known about the mind is that it goes forward not backward, that is, that it is evolving not devolving. Thus it is difficult for both the scientist and the common man to grasp that the external world of modern science shows no evidence of the state of evolution as opposed to devolution.

The evidence upon which science bases its distinction between "going forward" and "going backward" rests upon what is known as the second law of thermodynamics concerning entropy or the increase of the random element in the universe. The law states that entropy always acts in "plus time," that is, in time going in the only direction in which common sense says it goes.

Thus in two isolated events the one which has the greater amount of the random element is the later in time. We must imagine that the action of the universe is somewhat like a pack of cards being constantly shuffled. As the shuffling goes on the cards become more and more mixed, less and less organized in suits and sequences. Thus it is with atoms. In other words "the random element" is continually increasing, never decreasing.

Thus, in "plus time" we come to one end of the world. For a time comes at last when no matter how much longer the cards are shuffled "the random element" can increase no more, as everything is completely random. This entropy, or the increase of the random element, results in increasing radiation of energy or heat in the universe, so that scientists sometimes speak of this end of the world as the (*Turn Page*)

**BOULDER DAM AT NIGHT**

***The world's greatest dam is now rising during every hour of the twenty-four, as this striking night view of construction attests. The photograph was taken by Dr. Morton Mott-Smith of Hollywood, Calif. According to latest reports, more than 1,543,000 cubic yards of concrete had been placed in the dam by March 31 bringing the structure to a height of about 330 feet. A new record for concrete pouring was set on March 20 when 10,462 cubic yards went into the dam and auxiliary structures. The hardening concrete is being cooled by pre-cooled and refrigerated water. More men are working on the project than ever before, nearly 5,000 being employed. According to present progress, the pouring of mass concrete for the main dam will be finished by May 1935, and the $49,000,000 contract of the Six Companies will be completed in May 1937.***

GEOLOGY

# Layers Found in Asphalt May Describe Prehistoric Weather

SEARCHING for the bones of extinct animals that ages ago had become bogged down in asphalt deposits at McKittrick, Calif., V. L. VanderHoof came upon something that may be useful in forming an estimate of the kind of weather that was "unusual" on the Coast in those remote times. He found a succession of layers in the asphalt, which are comparable in a way to the annual growth-rings in trees, and may have been due to the same causes.

The yearly bands, he told members of the Geological Society of America, represent a yearly recurrence of physical conditions which are influenced by climate. Winter cold increases the viscosity of the tar so that it solidifies, while high summer temperatures render it fluid and able to flow down slope. Winter rains cause enough sheet wash to blanket with dirt the previous summer flow, thus sharply marking off one year's layer from another.

Mr. VanderHoof has measured and plotted a series of 180 of these bands, and efforts are now being made to correlate the resulting curves with similar curves resulting from studies of tree rings and of varves.

"heat death." The other end of the world, however, commonly called the beginning, is just as important scientifically, but is a great deal more difficult to construct. As we go back in "minus time" toward the "beginning," things become less and less random until, theoretically, they have become completely organized. The problem then arises of how they got that way.

One explanation depends upon the nature of the "second law" of thermodynamics which, like all so-called natural laws, is statistical. That is, it states what will happen in terms of innumerable observations of what has happened. It does not pretend to be absolute, but merely a statement on the basis of experience of an overwhelming probability, a probability of ten, raised to the twentieth power, to one. In the words of Sir Arthur: "If all my statements had as good a chance of being right, I would be afraid I was either a genius or a fool stating the obvious."

In these terms time may be imagined as extending indefinitely in both directions but having the character, not of a level plain, but of a series of mountains, the peaks of which represent states of complete organization and the valleys of which represent complete randomness. Logically, according to science, we progress over these peaks one after the other in turn, each journey up and down being an exact repetition of the one before so that "history" constantly repeats itself exactly.

Going "up the peak" from randomness to organization represents actually travelling reverse in time and going down the peak represents going in the direction which is ordinarily thought of as time. While science does not distinguish between the significance of the two directions, consciousness refuses to accept any but the downward direction from past to future, from the peak of organization to the valley of randomness or "heat death" where all is reduced to radiant energy.

Whereas for science it is perfectly reasonable thus to consider the direction of time's arrow in terms of plus and minus, for consciousness any reversal at all, any concept of minus time, is simply ridiculous. Thus matters stand at the moment. The dynamic quality of time which we instinctively sense and which the philosophers call "becoming" as opposed to "being" and the significance which we attach to it mentally is not explanable or describable by modern science. Once more the mind eludes analysis.



ARCHAEOLOGY

# Explorations at Ur Finished; Cemetery Found in Pit Bottom

## Abraham's Town Had Great History and a "Personality" Scientists Declare Summarizing Discoveries of 12 Seasons

**See Front Cover**

EXPLORATION at Ur of the Chaldees, one of the most remarkable archaeological projects ever undertaken, is finished, according to announcement made at the University of Pennsylvania Museum.

A report just received from C. Leonard Woolley, British archaeologist, who has directed the long campaign of digging, tells of the last discovery at Ur. This discovery is a cemetery of 200 graves found in the depths of a huge pit 50 feet deep, which is pictured on the front cover of this week's SCIENCE NEWS LETTER.

### Skeletons and Vases

Crumbling remains of skeletons, with tightly flexed knees and thighbones bent to right angles with the spine, were surrounded by vases and bowls. At the necks and waists of the bodies were found innumerable beads of crystals, lapis lazuli, carnelian, marble, shell, chalcedony, and one of gold. The age of these people of Ur is set at the fourth millenium before Christ, in a period which the archaeologists have named the Jemdet Nasr period.

In the latter days of this period, fashions of Ur evidently called for stone vases and bowls instead of the native clay, and the stone had to be imported from northern Mesopotamia, or from the Persian Gulf far away to the south. In the 200 graves, the archaeologists found 770 stone vessels of alabaster, gypsum, limestone, and diorite.

The British Museum and the University of Pennsylvania Museum have worked jointly at Ur for twelve seasons, finding the home town of Abraham to be a place with a great history and a "personality."

### Important Discoveries

Reviewing discoveries of paramount interest at Ur, Horace H. F. Jayne, director of the University Museum, included these:

1. Pre-Dynastic royal tombs of about 3500 B.C. were opened, revealing mute evidence of human sacrifice on a lavish scale. Bodies of kings, queens, and their servitors, buried with an unbelievable array of jewelry and household goods, attest to the artistry, culture and luxury of Ur's royal court 5,000 years ago.

2. Royal tombs of the great Third Dynasty were found, and, while these burials at Ur had been plundered, the massive and elaborate construction of the tombs is of great historic interest.

3. Residential districts of Ur, particularly about 2000 B.C., which was Abraham's time, revealed a surprising elaborateness in middle class dwellings. Many middle class homes had private chapels, and below the houses were family burial vaults.

4. The great public buildings of Ur were found grouped mainly in the Sacred Area. The Ziggurat, largest existing example of the great staged towers of Mesopotamian cities, dominated this center. Near it were the Treasure House and the Temple to the Moon-God. Several palaces were also found.

5. A bed of water-laid clay eight feet thick was discovered and pronounced evidence of a flood which marked a break in the history of Ur. The layers of remains above and below the barren clay level were of very different civilizations.



ORNITHOLOGY

# Ravens Know Trick Of Military Aviators

STUNTING in the air is not a new thing under the sun. One of the favorite tricks of the military aviator—a quick side roll to an upside down position, followed by a half-loop downward restoring the right side up position and reversing the direction of flight—is known to ravens.

Several observations of this turn have been observed by a German naturalist, J. O. Fulz, and have been reported by him to the weekly journal, *Die Umschau*.

**DRAWING NEW LIFE FROM THE DEAD**

***The life-restoring blood being injected into this patient's arm was taken from a dead body. A remarkable method of utilizing blood from victims of traffic accidents or other sudden fatalities was developed by Prof. Serge Judine of the Institute Sklifassovsky, Moscow's great emergency hospital. The value of this method for military surgery in time of war has been pointed out by General Robert U. Patterson, Surgeon General of the U. S. Army.***

RADIO

# Radio "Echoes" From Moon To be Sought by Thousands

WORLD-WIDE efforts to discover whether radio waves escape from the earth and are echoed back to it again from the moon and other distant parts of the solar system will shortly be inaugurated.

Prof. E. V. Appleton of the University of London, leading British investigator of the radio reflecting layers of the earth's upper atmosphere, plans to enlist the aid of thousands of radio enthusiasts throughout the world, to time echoes of powerful special signals, which it is hoped will pass through the outer layers of the atmosphere into space, and then be reflected from objects or layers within the solar system, as light is reflected from a mirror.

It is easy to tell how far a radio echo has travelled because the speed of radio waves is the same as light, which has been accurately determined.

Thus if the moon really does reflect radio echoes back to the earth, radio listeners should catch the echo in a little over two and one-half seconds after the signal is shot out into space; for the distance to the moon and back is approximately 480,000 miles, and the radio waves travel with the speed of light, somewhat over 186,000 miles a second. The distance to the moon varies, but the radiation velocity is assumed to be constant. If a "moon echo" of radio signals can be well established, it can probably be used as a research tool in astronomy, to gain better pictures of the moon's somewhat erratic travel path.

The British Broadcasting Company, which holds a government monopoly of all broadcasting in Great Britain, is cooperating with Prof. Appleton. The test signals will be sent out by the Empire Transmitter at Daventry, England. A World Radio Research League is being formed to assist in carrying out Prof. Appleton's project.

Besides a known radio echo of nearly the time-interval that would be required to get a signal to the moon and back, there are also two other puzzling long-period radio echoes, one of fifteen, the other of thirty seconds. These suggest the existence, somewhere in the solar system, of a reflecting object or layer, at a distance from the earth of approximately 2,800,000 miles, and another at double that distance.

*Science News Letter, April 21, 1934*

CHEMISTRY

## Mass Three Discoveries Close Gap in Elements

CLOSING a gap that has existed in the weights of the chemical elements, evidence for the existence of both hydrogen and helium of mass three has been found in Cavendish Laboratory researches at Cambridge University.

Dr. P. I. Dee reports in a communication to *Nature* that these hitherto unfound varieties of helium and hydrogen are created when hearts of double weight hydrogen collide. Here are two new units of matter brought into existence by the smashing of heavy hydrogen particles which only three years ago were themselves undiscovered.

Tracks of water vapor left behind after flights of the particles through a cloud chamber showed Dr. Dee that from heavy hydrogen collisions there emerged a proton or heart of an ordinary hydrogen atom and a triple-weight hydrogen atom heart. They recoiled in opposite directions.

Measurements of the energy of neutrons, themselves unknown a few years ago, also show that in the transmutation the helium of mass three is formed.

Scientists have been looking for an atom of mass three for many months, as the sequence of weights of atomic particles left a place for it. There was considerable speculation as to whether it would be hydrogen or helium. Now the evidence is that both hydrogen and helium of mass three can exist.

*Science News Letter, April 21, 1934*

MEDICINE

## "Polio" Germ May Enter Body Through Stomach

THE VIRUS or "germ" of infantile paralysis may enter the body through the digestive tract as well as via the nasal route, in the opinion of Dr. John A. Toomey, of Cleveland.

Dr. Toomey reported to the American College of Physicians that he was able to produce the disease in monkeys by injecting the causative virus into a part of the digestive tract from which it could easily reach the gray fibers of the nerves. He believes earlier failures to produce the disease by injections into the digestive tract were due to the fact that the experiments were not planned so as to give the virus a chance to reach the nerves before being swept out of the digestive tract.

*Science News Letter, April 21, 1934*

THE RENAISSANCE OF MEDICINE IN ITALY

By Arturo Castiglioni

Professor of the History of Medicine at the University of Padua, Dr. Castiglioni gives a brief survey of the essential features of Renaissance medicine, emphasizing the leading part played by Italy in this development.

105 pages, $1.50

The Johns Hopkins Press Baltimore

THE CARUS MATHEMATICAL MONOGRAPH NO. 5

A HISTORY OF MATHEMATICS IN AMERICA BEFORE 1900

By DAVID EUGENE SMITH, Professor Emeritus of Mathematics, Teachers College, Columbia University, and JEKUTHIEL GINSBURG, Professor of Mathematics, Yeshiva College, New York.

Pp. 209, Illustrated. Price $2.00

The latest publication of the Carus Mathematical Monographs, which are intended to make accessible at nominal cost the keenest researches in pure and applied mathematics, is purely historical. It deals with the development of mathematics in the United States from elementary beginnings in the colonial period, to the development of applied mathematics in connection with astronomy, physics, and natural science, on to the interest displayed in "pure mathematics" in the last quarter of the 18th century when the foundations were laid upon which modern developments are built.

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PUBLIC HEALTH

# Love of Pets Chief Obstacle In Conquest of Parrot Fever

## Public Does Not Realize Danger and Ease of Acquiring Psittacosis Even From Birds Other Than Parrots

IGNORANCE of the danger and deep-rooted love for pets are standing in the way of the conquest of parrot fever. These two obstacles to control of the disease and prevention of future outbreaks were pointed out by Prof. K. F. Meyer of the Hooper Foundation, University of California, at the meeting of the American College of Physicians.

The public does not appreciate the possible danger of contact with birds, particularly birds of unknown origin, Prof. Meyer said in discussing the disease, which has been a constant menace since 1929 and which claimed ten victims in Pittsburgh last month.

Facts about parrot fever or psittacosis known by scientists but little known by the public were presented by Prof. Meyer as follows:

Actual contact with or possession of parrakeets is not necessary to cause the disease. A brief visit in a room with birds or sojourn in a baggage car transporting birds may be followed by disease in persons susceptible to it.

Women are affected by the disease more frequently than men. This is partly because they are either engaged in breeding parrakeets for a livelihood or because as lovers of pets they come more closely in contact with the birds.

Not only parrots and parrakeets are susceptible to psittacosis, and consequently a possible danger, but also the canary, bullfinch, nonpareil, Java sparrow, cockateel, Bengalese, Pekin robin, and even the chicken.

Young birds are the chief danger as source of the disease. Mature birds, eight months or older, are much more resistant and are seldom if at all involved in human outbreaks. Over 70 per cent. or nearly three-fourths of human cases have been caused by newly acquired shell parrakeets.

The disease may be acquired by direct contact through handling the body of a dead bird, by feathers, by excreta, by nasal discharge and through bite wounds. It may also be acquired from virus particles in the air. There is no doubt that droppings or nasal discharges containing the disease-producing virus are readily scattered by the flying motions of the birds.

Psittacosis belongs to the class of filterable virus diseases. The specific causative agent consists of minute particles of living matter that can only be seen through a microscope and which are known as L. C. L. bodies or *Rickettsia psittaci*.

The disease has a high death rate, one out of every four or five cases ending fatally.

Commenting on the difficulty of control in spite of adequate scientific knowledge of it, Prof. Meyer said:

"The majority of bird breeders, pet-shop owners, lovers of birds and even veterinarians still doubt the existence of such a disease as psittacosis. Bird breeders and pet-shop owners whose parrakeets have caused sickness and death still declare in 1934 that psittacosis is an imaginary malady and the publicity hysterical propaganda to injure their business."

*Science News Letter, April 21, 1934*

ETHNOLOGY

## Navajos To Build Their Own Capital

NAVAJO Indians are to have their own capital at Window Rock, in Arizona. At the site, designated by Secretary of Interior Harold L. Ickes and Commissioner of Indian Affairs John Collier, the government will construct administration buildings from which the Navajos will direct their own affairs.

Window Rock, a beautiful site in the rocky, colorful mesaland of Arizona, was selected by Commissioner Collier in council with tribal chairmen and a committee. It is accessible to all parts of the Navajo reservation.

The Navajos will hold their own assemblies and have a larger measure of self-rule than they have had since the coming of white men. Indians will build the structures for their capital.

*Science News Letter, April 21, 1934*

# First Glances at New Books

**Agricultural Economics**

THE AMERICAN FARMER AND THE EXPORT MARKET—Austin A. Dowell and Oscar B. Jesness—*Univ. of Minnesota Press,* 269 p., $2. Whoever has read Henry Wallace's pamphlet, *America Must Choose* (and all Americans ought to have read it by now), might do very well to follow it up with this book. For although Professors Dowell and Jeness have presumably written their text independently of Secretary Wallace, their discussion parallels so closely the principles he had laid down that it might almost be considered a commentary upon it. They, like he, state the dilemma, and conclude that "The answer will be supplied largely by the attitude taken by the American people. Will they decide in a short-sighted spirit of narrow selfishness or will they really seek the objective of the greatest long-run gains?"

*Science News Letter, April 21, 1934*

**Archaeology**

BETH SHEMESH (PALESTINE)—Elihu Grant—*Biblical and Kindred Studies, Haverford, Pa.,* 222 p., $4. A running account of the archaeological investigation of a Canaanite city later occupied by the Israelites. The account may be called popular in the sense that a layman may understand and learn from it, and there is generally interesting information about the trials and excitements of an expedition. The book is primarily a book for study, however, stressing as it does the archaeological significance of the site and its contents. There are numerous photographs and drawings, including a number of pages showing pottery shapes and designs.

*Science News Letter, April 21, 1934*

**Automotive Engineering—Chemistry**

RUBBER AND AUTOMOBILES—Colin MacBeth—*Rubber Growers' Association, London,* 155 p. A few years ago the automobile manufacturer used very little rubber other than in tires and tubes, a usage which now absorbs 80 per cent. of the raw rubber produced. Today rubber is being used extensively throughout the construction of automobiles. This handbook illustrates and describes where rubber can be used effectively in automobiles.

*Science News Letter, April 21, 1934*

**Botany**

THE EVOLUTION AND DISTRIBUTION OF FLOWERING PLANTS. VOL. I: THE APOCYNACEAE AND ASCLEPIADACEAE—John Muirhead Macfarlane—*Noel Printing Co. (Philadelphia),* 181 p., 2 pl., $2.50. Veteran of many years of teaching and research at the University of Pennsylvania, with a thorough European training back of that, Prof. Macfarlane here begins to set forth the fruits of his long labors on the evolution, migrations and distribution of the higher flowering plants. In the present volume, which is intended as but the first of a series, he deliberately singles out for special treatment a pair of the most difficult of the plant families. Prof. Macfarlane's work will be of interest and value alike to taxonomist, ecologist and student of evolution.

*Science News Letter, April 21, 1934*

**Ecology—Sociology**

SKY DETERMINES—Ross Calvin—*Macmillan,* xii+354 p., $2.50. Rain means everything in New Mexico, and always has: cacti and tough shrubs fight each other with their spreading roots, Indian priests chant for clouds and in the old days killed the missionaries who tried to stop them, ranchers war over water-holes and politicians over irrigation dams. The always-impending danger of parching death conditions life in the Southwest in a thousand ways. Dr. Calvin has caught the drama of it, and presents it in a pleasing literary style in this book.

*Science News Letter, April 21, 1934*

**Education—Biology**

THE TEACHING OF BIOLOGY—William E. Cole—*Appleton-Century,* xiv+252 p., $2. Scientific pedagogy well tempered with common sense will make this a valuable book. It will of course be especially valuable to the young teacher; but there are in it many suggestions about new apparatus and methods that will make it worth while also to the veteran who aspires to keep his teaching up to date.

*Science News Letter, April 21, 1934*

**Embryology**

LABORATORY ATLAS OF THE 13-MM PIG EMBRYO—Edward A. Boyden—*Wistar Institute Press,* iv+100 p., $2. Second edition of a laboratory guide indispensable in the beginning course in vetebrate embryology.

*Science News Letter, April 21, 1934*

**Endocrinology**

RECENT ADVANCES IN ENDOCRINOLOGY—A. T. Cameron—*Blakiston's,* 365 p., $3.50. Prof. Cameron deserves much praise and gratitude for this compact and comprehensive summary of the voluminous endocrine research of recent years. The book is too technical for the lay reader unless he has considerable knowledge of biochemistry and of medical terms. But it will prove a boon to scientists other than endocrinologists who wish to keep abreast with the rapid developments in this important and popular field. There are numerous helpful charts and diagrams besides the usual photographic illustrations of endocrinologic subjects and an adequate index.

*Science News Letter, April 21, 1934*

**Engineering**

THE DESIGN AND USE OF INSTRUMENTS AND ACCURATE MECHANISM—T. N. Whitehead—*Macmillan,* 283 p., $3.50. How precision machine tools and scientific design cooperate to produce the instruments and precision machinery that makes possible so much of our industrial civilization is thoroughly and comprehensively discussed. The author is the son of Prof. A. N. Whitehead. He was recently scientific officer of the British Admiralty and is now assistant professor in the Harvard School of Business Administration. The book is written for designers of instruments but the principles are of wider application.

*Science News Letter, April 21, 1934*

**Medicine**

YOU MUST RELAX: A PRACTICAL METHOD OF REDUCING THE STRAINS OF MODERN LIVING—Edmund Jacobson—*McGraw-Hill,* 201 p., $1.50. Dr. Jacobson has written this book for the many people who need to relax but cannot do so suc- (*Turn to Page* 254)

▼ RADIO ▲

**DUST BETWEEN THE STARS**

**an address by**

**Prof. Joel Stebbins**

**Director of the Washburn Observatory at the University of Wisconsin**

**Wednesday, April 25, at 4:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.**

GEOGRAPHY

## Everest

● "THUS almost, before indeed I expected it, we swooped over the summit and a savage period of toil began The pilot swung the machine skilfully again towards the westward into the huge wind force sweeping downwards over the crest; so great was its strength that, as the machine battled with it and struggled to climb upwards against the downfall, we seemed scarcely to make headway in spite of our 120-mile an hour air speed. I crammed plate-holder after plate-holder into the camera, releasing the shutter as fast as I could, to line it on one wonderful scene after another. We were now for a few moments in the very plume itself, and as we swung round fragments of ice rattled violently into the cockpit."—P. F. M. Fellowes, Lord Clyesdale, L. V. Stewart Blacker, P. T. Etherton in FIRST OVER EVEREST! (*McBride*).

*Science News Letter, April 21, 1934*

CHEMISTRY

## Complexity in Simplicity

● "THE DIATOMIC hydrogen molecule $H_2$ is an object of the greatest scientific interest. It is made up of two protons and two electrons. It is thus one of the simplest structures which nature has provided. The only simpler ones are the electron, the proton, the hydrogen atom (1 proton + 1 electron) and the hydrogen molecular ion $H_2$ + (2 protons + 1 electron). In spite of this simplicity of structure it has an extraordinarily complicated spectrum in which some thousands of lines have been observed and their wave numbers measured. This many lined spectrum of hydrogen has been one of the basic puzzles of spectroscopy ever since the early days of spectroscopic history."—Owen Willans Richardson in MOLECULAR HYDROGEN AND ITS SPECTRUM (*Yale Univ. Press*).

*Science News Letter, April 21, 1934*

PSYCHOLOGY

## The Best Vocation

● "ON THE WHOLE, the vocational histories of these boys and girls are not in accord with the opinions of those enthusiasts for vocational guidance who assume that an examination of a boy or girl of fourteen and a study of his school record will enable a counselor to estimate his fitness to succeed in this, that, and the other sort of work.

"Vocational counselors of a certain type would use a superior record for conduct in school as evidence that the boy would be cooperative and dependable at work, a superior attendance record as evidence that he would be faithful and regular at work, rapid progress in school as evidence that he would be ambitious and eager to learn in business, and the like. They would accept the school records, the test scores, and their personal impressions of a boy or girl of fourteen or fifteen at par as indexes of his future behavior as a worker."—Edward L. Thorndike and others in PREDICTION OF VOCATIONAL SUCCESS (*Commonwealth Fund*).

*Science News Letter, April 21, 1934*

GENERAL SCIENCE

## Research

● "WHEN the history of America is written centuries hence, it will be noted that in the first quarter of the twentieth century business began to subsidize scientific research. That resounding fact may then be considered more important than any of the political or military events of our era. The laboratory, where trained men work quietly amid controlled conditions, is a seed-bed of social and political change as well as of scientific experiment."—Arthur Pound in THE TURNING WHEEL (*Doubleday, Doran*).

*Science News Letter, April 21, 1934*

ENDOCRINOLOGY

## Glands

● "BY A PROCESS of gradual selection the term 'endocrinology' (Gk. *endon,* within; *krinein,* to separate) has gradually become accepted as indicating the study of 'internal secretion.' It denotes the science, or the branch of science, concerned with the glands which separate within themselves *specific* compounds and secrete them into veins, or perhaps in one or two instances into their lymph vessels. These compounds effect, by reason of their specific chemical constitution, specific actions elsewhere within the organism. The glands concerned are *endocrine glands.* The specific compounds they form, frequently termed 'internal secretions,,' or *endocrine secretions,* perhaps should more accurately be spoken of as *endocrine principles* or, even better, as *endocrine compounds.* The last term stresses the fact that we are dealing with specific chemical substances, and not nebulous uncertainties which never have been and perhaps never will be isolated."—A. T. Cameron in RECENT ADVANCES IN ENDOCRINOLOGY (*Blakiston's*).

*Science News Letter, April 21, 1934*

THE AUTH

PHYSIOLOGY

## Relaxation

● "STRANGE as it may seem, until a decade or more ago, the term 'relaxation' scarcely appeared as a rule in technical or in popular works on nervous disorders. And to the layman it generally meant something like 'recreation.' But during recent years popular interest in the significance of relaxation as muscular limpness has seemed to expand, until now automobile dealers vie with bed manufacturers and beauty parlor managers in acclaiming its importance, while magazine articles tell you how to relax. If this is all that can be accomplished by our teachings on relaxation, we had better stop now. For the common practice today when a person is nervously or mentally upset or fatigued or exhausted is to have him change his occupation or rest in bed or take medicines or go off on a trip. It still is rare for either doctor or layman to observe tensions systematically or to think of cultivating relaxation. This reveals the need to consider evidence that relaxation in certain respects is the direct negative of nervous excitement; in other words, that *to be excited and to be fully relaxed are physiological opposites.*"—Edmund Jacobson in YOU MUST RELAX (*Whittlesey House*).

*Science News Letter, April 21, 1934*

ARCHAEOLOGY

## Dirt

● "WHEN lecturing in America, I am often asked, 'How did these cities become filled up in the fashion of the tells [mounds]?' It came about from the peculiar fact that the Canaanite and Israelite cities had no street-cleaning department. Not only was the rubbish of the streets allowed to accumulate, but the rubbish of the houses also was swept into the streets and left there. If the accumulation rose above the threshhold,—well, they put in a new floor and raised the roof, if necessary. But *they did not clear the streets.* This reasonable explanation has now absolute physical confirmation in our work this year."—Melvin Grove Kyle in EXCAVATING KIRJATH-SEPHER'S TEN CITIES (*Wm. B. Eerdmans*).

*Science News Letter, April 21, 1934*

# THORS SAY:

BOTANY

## India Rubber

● "UNLIKE the wealth that is locked in the soil, India rubber is movable. India rubber trees can be systematically grown and exploited in large plantations, though only in damp, warm, tropical regions. The march of the India rubber trees round the tropical zone, which has taken place within a few decades, is perhaps the most interesting example of the rapid transformation of whole regions by new industry, because of the change of locality of the areas planted and the shifting of great masses of money wealth."—Leo Hausleiter in THE MACHINE UNCHAINED (*Appleton-Century*).

*Science News Letter, April 21, 1934*

ETHNOLOGY

## Heroes

● "THE ANCIENT Chinese who lived some four thousand years ago seem to have been as materialistic as the twentieth century Americans. Look at the gallery of their heroes. Who were they? Were they founders of religion? Were they conquerors, or scholars? No, they were builders and inventors—the inventor of fire, the discoverer of herbs, the inventor of agricultural implements, and so on. The heroes of modern America are of the same stuff as were the heroes of ancient China. But look what happened. The Chinese went crazy about pure learning and condemned all things practical and brought forth the present state of misery and poverty. I hope America will never repeat the tragic history of the Middle Kingdom."—No-Yonk Park (Pao) in AN ORIENTAL VIEW OF AMERICAN CIVILIZATION (*Hale, Cushman & Flint*)

*Science News Letter, April 21, 1934*

MEDICAL ECONOMICS

## Medical Care

● "IF WE LEARN anything from history, we must be resolved that the economic problems which confront American medicine should be solved by the joint action of lay and professional groups. Yet we must recognize that if such cooperation does not become a reality, solutions may be imposed upon both the public and the profession by ambitious politicians or by designing bureaucrats. And these solutions may not be the best which can be designed in the public interest.

Many persons, lay and professional, are convinced of the need and the opportunity for public service in a sound reordering of the functional relations of medicine. No good purpose is served by denying the existence of the problem or by acrimony between lay and professional groups which have fundamentally common interests. Neither denials nor hard names will create a current or stem a tide. The times call for action and the problems for wise and judicious solutions."—I. S. Falk in MILBANK MEMORIAL FUND QUARTERLY.

*Science News Letter, April 21, 1934*

PHYSICS

## Approaching Nothing

● "THE NEAREST we can get to nothing on this planet is the modern high vacuum and yet a cubic inch of the best vacuum is densely populated with more molecules of gas than there are people on the earth, with 40,000,000,000,000, to be exact. And at that, only one ten-billionth of the original gas is left, thanks to Langmuir's mercury vapor pump.

"'If from a vessel holding a quart there were removed one million molecules a second, it would take 750,000,000 years to remove practically all of its air, but the Langmuir pump accomplishes this in just two seconds.' Even so, our highest vacuua are quite dense as compared to some of the distant stars, 'incandescent masses of nothing at all.'"—Harry N. Holmes in OUT OF THE TEST TUBE (*Ray Long & Richard R. Smith*).

*Science News Letter, April 21, 1934*

PHYSICS

## Electromagnetism

● "THE ELECTROMAGNETIC theory, as developed by Maxwell and extended by his successors, must be regarded as the crowning achievement of all but the last decade of the nineteenth century. And it is still, after more than 50 years, a large factor, perhaps even a dominating one, in present-day physics, whether one judges its greatness by the fertility of its application to the problems of pure science or by the more practical test of its value in the applied science of radio communication.—F. K. Richtmyer in INTRODUCTION TO MODERN PHYSICS (*McGraw-Hill*).

*Science News Letter, April 21, 1934*

SOCIOLOGY—GEOGRAPHY

## Renaissance

● "THIS apparently sudden rebirth of new ideas which are grafted on ancient tradition, this almost violent blossoming of new buds with wonderful energy, this spiritual revival similar to the awakening of nature in spring, often happens in Mediterranean history at different intervals, together with a vigorous assertion of individuality. . . .

"The obvious question arises as to why things of such moment happened more frequently if not exclusively around the Mediterranean: there are the same causes that have contributed to the formation of Mediterranean mentality; a facile emotionalism and receptivity, tempered by a well developed critical sense, due to the crossing for thousands of years of thousands of currents and streams of traffic and ideas deriving from opposite origins; last but not least the local climate where all nature's enchantments contribute to a constantly alert spirit, a vivid mind and watchful senses."—Arturo Castiglioni in THE RENAISSANCE OF MEDICINE IN ITALY (*Johns Hopkins*).

*Science News Letter, April 21, 1934*

ENTOMOLOGY—SEISMOLOGY

## Termites and Earthquakes

● "THE LONG BEACH earthquake indicated that termite damage prepares the way for earthquake damage, and may thereby prepare the way for a conflagration. It is entirely possible that an earthquake may prepare the way for termite damage. In the recent southern California disturbance, numerous cracks were found in the concrete, brickwork, and stucco of literally thousands of buildings which were otherwise not seriously injured. Such cracks, as has been indicated in other chapters of this book, provide termites with access to the wooden parts of the buildings and should be carefully repaired to avoid future infestations."—Charles A. Kofoid in TERMITES AND TERMITE CONTROL (*Univ. of California Press*).

*Science News Letter, April 21, 1934*

HISTORY

## Russia

● "THE FAIR yardstick in considering the present status of the Soviet Union is not a comparison with a highly developed industrial nation like the United States, the result of generations of development; but a measurement of the differential between what the Russian people potentially had before the

Revolution, and what they potentially possess today. . . .

The ordinary commodities which we unthinkingly buy every day at the five and ten cent stores or the chain stores are great luxuries to the Soviet citizen. . . .

Greater results have been obtained up to the present time on the cultural side of Soviet life than on the economic and the greatest progress of all has been in education. . . .

It is interesting to note that in 1931 newspapers in the U.S.S.R. were printed in 63 different languages.

Russia has probably more magazines of general information or with a literary slant than any other country in the world. . . .

The Orchestra of the Bolshoi Theatre in Moscow numbers 125 musicians and is as fine an organization as exists anywhere in the world. Innumerable symphony orchestras exist everywhere. . ." —Alcan Hirsch in INDUSTRIALIZED RUSSIA (*Chemical Catalog*).

*Science News Letter, April 21, 1934*

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ARCHAEOLOGICAL MONUMENTS OF MEXICO—Department of Education, Republic of Mexico—*Appleton-Century*, $3.

ARCHAEOLOGICAL TOURS FROM MEXICO CITY—R. H. K. Marett—*Oxford*, $1.25.

BETH SHEMESH—Elihu Grant—*Haverford College*, $4.

CULTURAL ANTHROPOLOGY—Albert Muntsch—*Bruce*, $3.

THE DISTRIBUTION OF ABORIGINAL TRIBES AND LANGUAGES IN NORTHWESTERN MEXICO—Carl O. Sauer—*Univ. of Calif. Press*, $1.

EXCAVATING KIRJATH-SEPHER'S TEN CITIES—Melvin Grove Kyle—*W. B. Eerdmans Pub. Co., Grand Rapids, Mich*, $2.50.

LURISTAN BRONZES IN THE UNIVERSITY MUSEUM—Leon Legrain—*Univ. of Pennsylvania*, $2.

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OUR PRIMITIVE CONTEMPORARIES—George Peter Murdock—*Macmillan*, $5.

PARTHIAN POTTERY FROM SELEUCIA ON THE TIGRIS—N. C. Debevoise—*Univ. of Michigan Press*, $1.50.

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THE ROYAL CEMETERY. VOL. II: Ur Excavations—C. Leonard Woolley—*Univ. of Pennsylvania*, $15 until April 30, 1934; thereafter $20.

SEMITIC AND HAMITIC ORIGINS—Geo. A. Barton—*Univ. of Pennsylvania*, $4.

STANDARDS OF POTTERY DESCRIPTION—Benjamin March—*Univ. of Michigan Press*, 75c.

WHITE INDIANS OF DARIEN—Richard O. Marsh—*Putnam's*, $3.

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YOUR GERMS AND MINE—Berl ben Meyr—*Doubleday, Doran.*

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BRITISH ECONOMIC GRASSES: THEIR IDENTIFICATION BY LEAF ANATOMY—S. Burr and D. M. Turner—*Longmans, Green*, $3.75.

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GARDENS AND GARDENING 1934—Ed. by F. A. Mercer—*Studio Publications*, $4.50 cloth, $3.50 wrapper.

A HISTORY OF AGRICULTURE IN THE STATE OF NEW YORK—Ulysses Prentiss Hedrick—*N.Y. Agr. Exper. Sta.*, $3.

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## Chemistry

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THE ARTIFICIAL TRANSMUTATION OF THE ELEMENTS—Lord Rutherford—Oxford, 40 cents.

BIOCHEMISTRY LABORATORY MANUAL—F. C. Koch—*Williams & Wilkins*, $2.25.

BOOK OF FORMULAS—*Popular Science Monthly*, $1.

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THE ECONOMICS OF MINING—T. J. Hoover—*Stanford Univ.*, $6.

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ENGINEER-CUSTODIAN'S MANUAL—Thomas J. Brett—*Am. Technical Soc.*, $2.50.

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MODERN ENCYCLOPEDIA FOR CHILDREN—Ed. by John R. Crossland and J. M. Parrish—*Wm. Collins*, $2.50.


INDUSTRIALIZED

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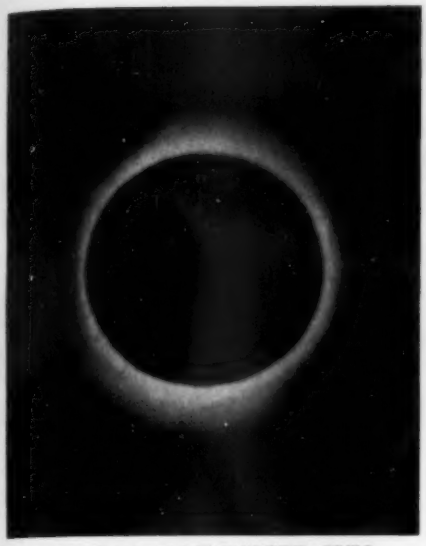

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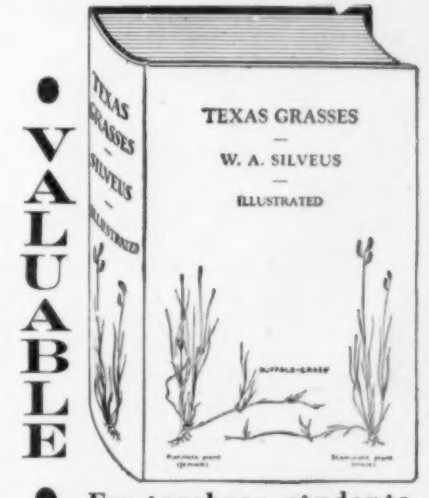


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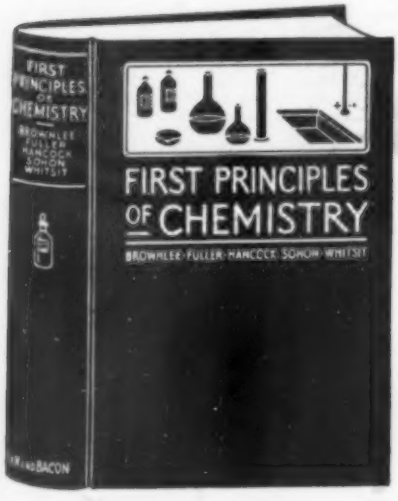
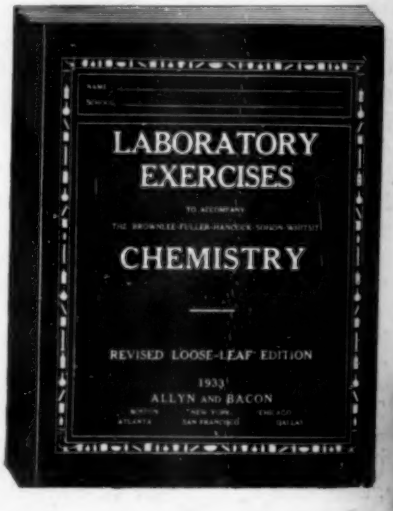
# THE WORLD OF CHEMISTRY

WE LIVE our lives amid material things. To the understanding of this environment man has given centuries of toil and thought. Slowly superstitions have given way to scientific facts. Great minds have delved in obscurity to bring forth scientific principles. When these were numerous enough and became properly classified, the sciences of today came into being.




The pathways to the sciences were not dull and humdrum, for along the road lay adventure, romance, and even tragedy. Ever the scientist sought the truth. Always he regarded his labors as vain unless he gave a better understanding of the world about him and turned his discoveries to the service of mankind.

Chemistry offers a rich field to the inquiring mind and brings great reward to those who understand its teachings. It is of constant practical value. It tells how to select proper materials for every kind of construction. It has rendered available many metals and special alloys that make our trains, automobiles, and airplanes more serviceable. It has made the soil more fertile and has revealed the nature of our food. It shows us that the human body is a living chemical laboratory, and that even thought has a chemical basis.




The modern textbook in chemistry reflects its history, spirit and service to mankind. It is not a mere epitome of facts—scientific principles serve as luminous guides along the course the learner must take. Vivid illustrations and simple language make clear the practical applications of science. There is careful selection of valuable topics properly grouped. There are devices for testing the learning of the student in accord with modern educational practice.

Tested laboratory exercises supplement the ideal textbook and guide the student in his first-hand study of chemical phenomena. They make him appreciate the vividness of chemical reactions and train him to draw only those conclusions justified by the observed facts.

Best of all, the study of chemistry in this modern manner trains the mind in straight, honest thinking—the true preparation for facing the realities of the present day.

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